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CASE REPORT

FDG-PET and MALT lymphoma in the parotid gland

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Summary There is conflicting evidence in the literature as to the role of positron emission tomography (PET) using 18-fluoro-2-deoxyglucose (FDG) in the staging and management of mucosa associated lymphoid tissue (MALT) lymphoma. We report a case of FDG avid MALT lymphoma of the parotid gland supporting the recently published series in the literature and suggest that whole body FDG-PET could be a useful technique in some patients with MALT lymphoma. Detection of FDG avid disease would spare patients several invasive investigations and reduce the radiation burden of staging. Where FDG avid disease is detected, PET could play an important role in follow up as well. A negative scan, whilst unhelpful for staging, comes at an acceptable radiation dose in the context of defining the primary disease.

Introduction

Positron emission tomography (PET) has been in existence for in excess of 20 years. More latterly it has found an increasing role as an aid to the diagnosis, prognosis, and monitoring of a variety of different malignancies. PET provides functional imaging of tumour physiology, and as such complements, or in specific circumstances supersedes standard structural imaging modalities.

MALT lymphoma

MALT lymphomas are B-cell lymphomas of the non-Hodgkin's type. They are rated as extranodal marginal zone lymphomas of MALT-type in the Revised European-American classification of lymphoid neoplasms (REAL) classification.[1] The MALT lymphomas may be classified as low and/or high-grade histologically. They may arise in the aerodigestive tract, lung, oropharynx, breast, lacrimal and salivary

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glands and the genitourinary system, and may be multi-focal. A consistent feature in their genesis appears to be a background of chronic antigenic stimulation, perhaps best exemplified by the relationship between *Helicobacter pylori* and gastric MALT lymphoma.[2]

MALT lymphomas appear to be derived from the 'centrocyte-like' cells that surround the B-cell follicles. The tumour cells resemble these cells and share their phenotypic and functional properties. One of these properties is to enable cells to infiltrate epithelium and in doing so form one of the characteristic features of these tumours, the lymphoepithelial lesion.

Case report

A 49-year-old Vietnamese lady was referred to the Maxillofacial Unit with a painless right-sided facial swelling. This had been present for 2 months but had not changed in size over that period. Examination revealed a firm, 2×3 cm non-tender mass in the right pre-auricular area. There was no deficit in facial nerve function and no associated cervical lymphadenopathy. Intra-oral examination was unremarkable and specifically there was no bulging of the right oropharynx. Past medical history was unremarkable. Ultrasonography (US) demonstrated a well-circumscribed 2 cm diameter solid mass within the right parotid gland, consistent with benign parotid neoplasia. Fine needle aspiration cytology (FNAC) showed features consistent with benign reactive hyperplasia but could not rule out lymphoma. Routine haematological screening and chest radiography were unremarkable.

In view of the size of the lesion and the failure of FNAC to exclude neoplasia the patient underwent a right superficial parotidectomy. Histology revealed a $2 \times 1 \times 1$ cm mass, the features of which were consistent with B-cell MALT Lymphoma.

Following this diagnosis further staging investigations including CT of the head and neck, chest, abdomen and pelvis, a bone marrow aspirate and trephine, were all negative.

The patient was reviewed regularly on the oncology clinic and initially remained disease free. However, 18 months after surgery a 1-cm mobile non-tender swelling was noted in the left pre-auricular region. Magnetic resonance imaging (MRI) demonstrated a poorly defined, non-homogenous mass within the left parotid gland but no evidence of recurrent tumour in the residual right parotid gland (Fig. 1). FNAC of the lesion on this occasion revealed features consistent with MALT lymphoma.

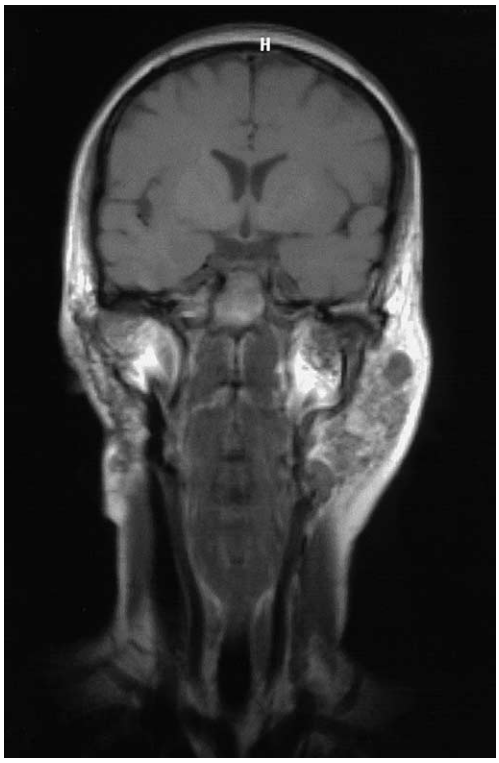

Figure 1 MRI (coronal section) demonstrating ill defined mass within the left parotid gland. No evidence of tumour in the right parotid gland.

The patient was restaged according to our standard protocol outlined above. In addition whole body FDG-PET was performed which showed two foci of increased glucose activity in the left parotid region (Fig. 2). Tracer uptake in the right parotid gland and the rest of the body was normal.

The patient subsequently underwent a left superficial parotidectomy. Histology of the lesion revealed a dense infiltrate of centrocyte-like cells, scattered blasts and plasma cells. A pale collar of centrocyte-like cells with B-cell morphology surrounded the numerous lymphoepithelial lesions. These neoplastic cells expressed CD20, IgM and showed kappa light chain restriction. These features are consistent with a diagnosis of extranodal marginal zone B-cell MALT lymphoma (Fig. 3). The patient remains well 15 months following her most recent procedure.

Discussion

FDG-PET is a useful imaging tool in a wide variety of cancers including malignant melanoma, lung, colorectal, breast, cervical, oesophageal and head and neck cancer.[3] In addition the majority of lymphomas are FDG avid.[4]

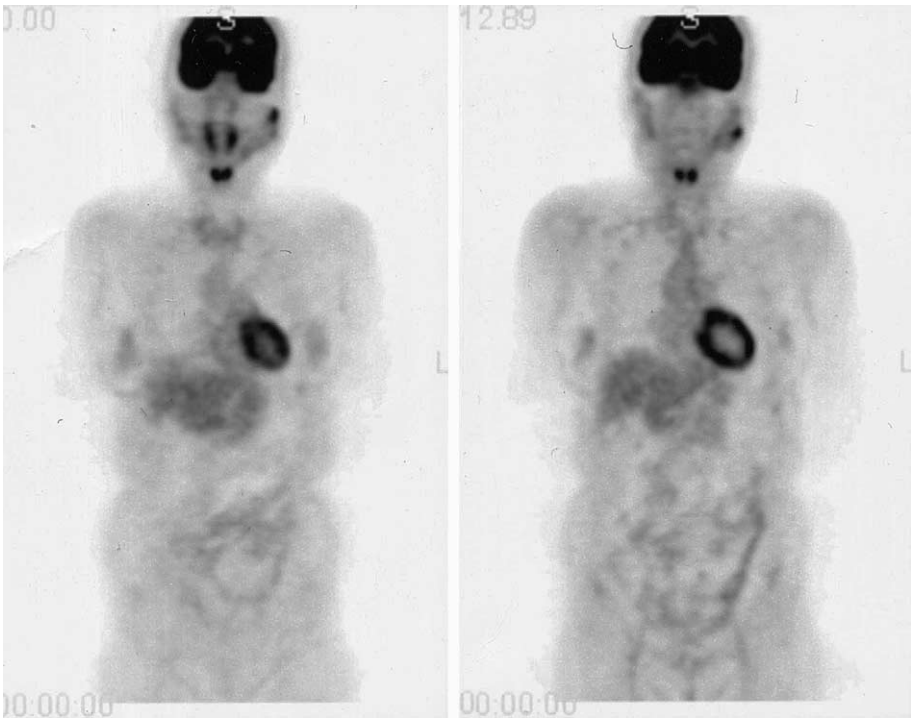

Figure 2 F-18-FDG whole body PET demonstrating multi-focal MALT lymphoma in the left parotid gland.

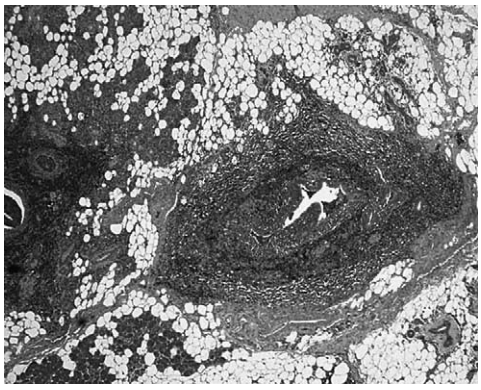

Figure 3 Photomicrograph of a section through the left parotid gland demonstrating features of MALT lymphoma (hematoxylin and eosin stain).

There are contradictory reports in the literature regarding the utility of FDG PET in MALT lymphoma. Hoffman et al. [5] in 1999 reported a series of 10 patients with MALT lymphoma who underwent FDG-PET scanning and reported no focal tracer uptake in any of the 10 patients. In 2003 the same group published their findings from a series of 21 patients with marginal zone lymphomas. 14 out of 21 had extranodal marginal zone lymphoma of the MALT type.[6] Once again, they reported that none of the 14 patients had focal tracer uptake in their respective tumour sites. In 2002, two case reports were published that showed focal tracer uptake in lung MALT lymphomas[7,8] and more recently in 2005, Beal et al.[9] reported a series of 42 patients with MALT lymphoma. In 34 of 42 patients, there was FDG avidity demonstrating that MALT lymphomas can be detected in the majority of patients.

In all these series, only two cases of parotid MALT lymphoma were reported. Only one was FDG avid in the most recent series.[9] Our case is the only other reported case of FDG avid MALT lymphoma of the parotid gland.

Staging in MALT lymphoma is complex involving a number of invasive investigations because of the wide distribution of MALT within the body, the possibility of multi-focal disease and the propensity for distant spread. Indeed comprehensive staging commonly includes ophthalmologic evaluation, panendoscopy with multiple biopsies, CT of the thorax and abdomen and bone marrow biopsy. Although this battery of investigations may seem formidable it has until now been the only way to stage patients and determine appropriate management.

The potential advantages of FDG-PET in this regard are fourfold. Firstly it can stage the whole body in a single investigation in less than 1 h, secondly it can detect low volume disease (<1 cm^3), thirdly it can assess extranodal sites such as the liver and spleen better than CT, and finally, the radiation dose to the patient is less with PET than

with extensive examination by CT (10 mSv versus 30 mSv).

Conclusion

The use of FDG-PET in staging and management of MALT lymphoma remains unclear. More reports are being published in the literature that support the role of FDG-PET as a valuable imaging and staging tool. We report a case of FDG avid MALT lymphoma of the parotid gland. Detection of FDG avid disease would spare patients several invasive investigations whilst reducing the radiation burden of current staging protocols. A negative scan, whilst unhelpful for staging, comes at an acceptable radiation dose in the context of defining the primary disease. Further studies of FDG-PET in MALT lymphoma are clearly required to clarify its role in investigating and monitoring such disease. However, our case report and other recent series support the idea that such investigative effort is warranted.

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